

Improving social skills in kids with autism

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Credit: Rush University Medical Center

Waving goodbye and blowing kisses—no parent wants to miss out on those special moments. Among the 1 percent of the population of the United States who are diagnosed with autism, however, these small but important gestures often are missing from their behavior. Researchers at the Autism Assessment, Research, Treatment and Services Center (AARTS) Center at Rush University Medical Center have set out to alleviate this absence.

The efforts include the development of a tool that can monitor subtle social communication behaviors in people with developmental and psychiatric conditions including autism. The researchers then use this information to improve the individual's communication skills and quality of life.

"The process of evaluating and finally diagnosing someone with autism is complex and expensive. An additional, and sometimes overlooked, barrier is the level of expertise required to make this diagnosis," says Latha V. Soorya, PhD, assistant professor of psychiatry at Rush. Along with Mark Pollack, MD, chairperson of the Department of Psychiatry at Rush, Soorya is heading up the project in collaboration with a software team at Eotvos Lorand University in Budapest.

It's a unique partnership between industry and academia that uses motion detectors, high-tech eye tracking glasses and machine learning to develop objective measures of subtle social behaviors. The "smart glasses," Tobii Pro, are somewhat like Google Glass, and give the researchers the capability to analyze where the person with autism is looking, their facial expressions, and the extent to which they are making eye contact.

Watching children play

Soorya and her research colleagues are studying the use of this novel, automated social-communication assessment in a Rush lab. Instead of being stocked with microscopes, though, this lab is a room full of toys.

There, children being assessed are introduced to a clinician, who will be the one donning the smart glasses. The clinician begins a standardized semi-structured play assessment such as the Autism Diagnostic Observation Schedule. As the clinician watches the child, cameras in the glasses record the interaction, providing researchers, clinicians and families with objective information about key social behavior such as gesturing, eye gaze and facial expression. In addition, two- and three-dimensional video cameras in the room record the interaction.

The technology is being used in two ongoing trials that currently are [accepting new participants](#). One study examines a combination treatment of oxytocin nasal spray with researcher-led group play activities designed

to teach social skills. Members of this group of four or five children, which meets for 12 weekly sessions at the AARTS Center, will be randomly assigned to the combination treatment or the social play group.

"We are teaching children how to read another person's body language and emotions, and what's known as theory of mind—that is, understanding one's thoughts and emotions and the fact that others may have differing beliefs," Soorya says. "We are also administering oxytocin, a synthetic hormone that has been shown to have a role in social attachment and bonding."

Is a girl looking at people more frequently than before? Is a boy paying more attention to faces? These are some of the questions that can be answered using the eye tracking system. Software the research collaboration is developing use machine learning to analyze patterns from the [smart glasses](#) and cameras, producing a report on measurements of the child's social behaviors.

"The information we collect from this technology will be compared against standard measures, including semi-structured play assessments and clinician ratings of improvement," Soorya says. "We will be able to compare changes in children who participate in the social thinking group to changes in children who participate in other group therapies which do not explicitly teach emotions and social thinking."

Learning to follow examples

The second study is led by a Rush postdoctoral fellow, Allie Wainer, PhD, who is developing a tele-health delivery system for evidence-based early interventions addressing important, early social-communication behaviors such as imitation and play. "With reciprocal imitation training (RIT), children and parents learn to imitate one another, thus enhancing their relationship. However, it's hard to measure changes in subtle social

communication skills in these very young children" Wainer explains.

Wainer's study uses the eyeglass system to analyze children's nonverbal behavior and the extent to which they are able to imitate their parents. "These results will help us understand how parents' use of the RIT techniques can lead to changes in important early social communication skills," Wainer says.

Wainer has developed a website that can be used by parents to learn the RIT techniques, with the hope that this will help families better access and learn intervention techniques that can help their children. Distribution of online programs is a real concern for the researchers, because there are many instances of providing people with apps or websites that they do not use them.

"Before this technology is disseminated on a large scale we want to find out why someone might stop using it and address those concerns," Soorya says.

Using fake language to convey feelings

To further advance the assessment and treatment of subtle [social-communication skills](#), the researchers are incorporating a game in which children can watch videos of trained actors saying sentences in a fake language. "There is no semantic meaning to be understood; instead, the goal is to have the children pick up on the emotions," Soorya explains.

The project uses a database of audio and video recordings featuring actors displaying different emotions. An instructor will explain to the children that they'll see someone acting out a feeling, but they won't understand what the actor is saying. The researchers will use their technology to assess emotional and nonverbal communication patterns in [children](#) with autism.

These Rush scientists are interested not only in advancing the research process, but also are determined to make participation in studies more possible for caregivers. "These tools have potential to reduce time to diagnosis as well as provide objective outcomes for clinical trials—a critical gap in advancing treatment development and dissemination of effective treatments," Soorya says.

If these researchers can help parents enter and understand their child's world, then strides can be made and family ties can be strengthened.

Provided by Rush University Medical Center

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